Policy of Water-related Disaster Preparedness in Indonesia

by:

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1. Potency of Water Resources in Indonesia

INDONESIA
Total Potency : 3.9 trillion m³ / year
2. River Basin-based Water Resources Management

Map of River Basin Territory (RBT) in Indonesia

<table>
<thead>
<tr>
<th>No.</th>
<th>STATUS of RIVER BASIN TERRITORY (RBT)</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TRANS BOUNDARY</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>TRANS PROVINCE</td>
<td>31</td>
</tr>
<tr>
<td>3</td>
<td>NATIONAL STRATEGIC</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>TRANS DISTRICT</td>
<td>52</td>
</tr>
<tr>
<td>5</td>
<td>DISTRICT</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>128</td>
</tr>
</tbody>
</table>
3. Strategic Issues: Existing Condition

1. The capacity of water storage per capita is about 63.5 m³/capita (much lower than Thailand, 1,277 m³/capita and one level above Ethiopia, 38 m³/capita).

2. Total Irrigated Areas: 7.145.168 ha, 43% of them are in poor condition.

3. Up to 2014, the raw water capacity is 51.44 m³/sec) to serve about 66.35% of the population;

4. There are 34 existing dams that have the potential of Hidro-Power Plan (about 84.5 MW) to be developed.

5. The frequency of floods in several large cities are still high:
   - Due to alteration in rainfall patterns and climate;
   - Watershed degradation due to land conversion;
   - Inconsistency of land use against spatial planning;
   - limited funding regarding flood protection;
4. Driving Factors

1. Population growth leads to increased demand for water;
2. The conversion of rural into urban will increase the need for water (due to various activities in urban areas, urban needs outweigh those of rural);
3. Climate change, such as the alteration of rain frequency and intensity, leads to high intensity of flooding and drought in some regions;
4. Watershed and environmental damage strongly increase the level of erosion, sedimentation, and water pollution;

Increasing Number of Critical Catchment Area (CA)
5. Profile of Water-Related Disasters

Disasters during 1982-2012

Most of the disasters occurred in Indonesia are hydro-meteorological disasters

Trend of Water Related Disaster in Indonesia

<table>
<thead>
<tr>
<th>Disaster</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake and tsunami, 2004</td>
<td>Aceh &amp; North Sumatera</td>
</tr>
<tr>
<td>Earthquake and tsunami, 2006</td>
<td>Pangandaran, West Java</td>
</tr>
<tr>
<td>Big Flood, 2007 &amp; 2013</td>
<td>Jakarta, Java</td>
</tr>
</tbody>
</table>

Cities Prone to Flood

<table>
<thead>
<tr>
<th>Cities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jakarta</td>
<td>1</td>
</tr>
<tr>
<td>Bandung</td>
<td>2</td>
</tr>
<tr>
<td>Surabaya</td>
<td>3</td>
</tr>
<tr>
<td>Solo</td>
<td>4</td>
</tr>
<tr>
<td>Medan</td>
<td>5</td>
</tr>
<tr>
<td>Padang</td>
<td>6</td>
</tr>
<tr>
<td>Pekalongan</td>
<td>7</td>
</tr>
<tr>
<td>Jambi</td>
<td>8</td>
</tr>
<tr>
<td>Banda Aceh</td>
<td>9</td>
</tr>
<tr>
<td>Lampung</td>
<td>10</td>
</tr>
<tr>
<td>Banjarmasin</td>
<td>11</td>
</tr>
<tr>
<td>Palangkaraya</td>
<td>12</td>
</tr>
<tr>
<td>Makassar</td>
<td>13</td>
</tr>
<tr>
<td>Ambarawa</td>
<td>14</td>
</tr>
<tr>
<td>Manado</td>
<td>15</td>
</tr>
<tr>
<td>Solo</td>
<td>16</td>
</tr>
<tr>
<td>Pontianak</td>
<td>17</td>
</tr>
<tr>
<td>Jayapura</td>
<td>18</td>
</tr>
<tr>
<td>Soerabaya</td>
<td>19</td>
</tr>
<tr>
<td>Palu</td>
<td>20</td>
</tr>
</tbody>
</table>

Flood Event Intensity

2011 2012 2013

0 100 200 300 400 500 600 700 800 900 1000
6. Mitigation Measures for Water-Related Disaster

NON STRUCTURAL MEASURES
- Spatial plan
- Conservation
  (Increase carrying capacity of critical watershed in upstream)
- Develop disaster risk management
- Increase public awareness and participation
- Risks mapping
- Early Warning System

STRUCTURAL MEASURES
- Check Dam
- Flood protection (dam, dike)
- River improvement
- Sediment control
- Coastal protection
The image presents a roadmap for the Policies of Water Resources Management (WRM) from 2015 to 2019. The roadmap is divided into three main sections: existing conditions, key areas, and intervention purposes.

### Existing Conditions
- **Driving Factors**
  - Controlling the Destructive Force
  - Controlling of Floods, volcanic mudflow, abrasion
- **Key Areas**
  - Water Resources Development
  - Conservation
  - Sustainability
  - IWRM

### Intervention Time Frame
<table>
<thead>
<tr>
<th>Time Frame</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
</table>

### Purposes
- **Irrigation Development**
  - Irrigation increase rice production up to 88.7%
- **Improvement Storage**
  - Storage capacity 14 billion m³ and 56.56 m³/capita
  - The utilization of potential energy: 142.52 MW of existing dams
- **Raw Water Provision**
  - Raw water to meet the needs of clean water
- **Operation & Maintenance**
  - Increasing the sustainability of water resources and function of WR infrastructures
  - Increasing coordination among stakeholders
- **IWRM Implementation**
  - Area protection of 200 thousand hectares
  - Area protection, restoration, revitalization

### Challenges
- **Development**
  - 1 million Ha
  - 65 Dams
  - 118.96 m³/sec

- **Rehabilitation**
  - 3 million Ha
  - 3.000 KM
  - 500 KM
  - 300 Sabo dams

The image also highlights the importance of controlling and conserving water resources through various methods and technologies, aiming to improve sustainability and infrastructure coordination.
8. Programs toward Water-Related Disasters

STRATEGIC PLAN 2015-2019

- Managing the flood prone areas of about 200 thousand hectares spreading on 20 cities in Indonesia
- Improving the conveyance of river with a length of about 3000 kilometers
- Protecting coastal line from abrasion with a total length of about 500 km
- Development of sediment and lahar control structures at about 300 locations
- Development of infiltration wells, retention ponds and pump houses.
### 9. Target and Budget for ‘W-R’ Disaster Preparedness

<table>
<thead>
<tr>
<th>Category</th>
<th>Development</th>
<th>Rehabilitation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Irrigation, Swamp, Pond, Groundwater</strong></td>
<td>45,000 Ha</td>
<td>298,000 Ha</td>
<td>5.7 T</td>
</tr>
<tr>
<td><strong>Big Dams &amp; Small Dams</strong></td>
<td>22 on-going dams, 8 new dams; 387 ponds/small dams</td>
<td>5 dams, 69 ponds/small dams</td>
<td>6.3 T</td>
</tr>
<tr>
<td><strong>Lake Revitalization</strong></td>
<td>7 lakes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Floods, Mudflow, Coastal</strong></td>
<td>148 km</td>
<td>23 km</td>
<td>5.5 T</td>
</tr>
<tr>
<td><strong>Volcanic Mudflow Protection</strong></td>
<td>27 SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coastal Protection</strong></td>
<td>20.49 km</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Urban Drainage</strong></td>
<td>11 km</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Budget</strong></td>
<td>21%</td>
<td>12%</td>
<td>26.6 T</td>
</tr>
</tbody>
</table>

**2016**

**Operation & Maintenance**

- O&M for WR infrastructures
- Emergency Response & equipment
- P3TGAi at 900 locations

**Groundwater, Raw Water**

- Development: 6,27 m³/sec
- Rehabilitation: 0.92 m³/sec

**Others**

- IWRM: Rp 459 M
- Management, BWS/BWS Rp 521 M
- Other supports: Rp 1,62 T [Salaries, etc.]

Total Budget = 26.6 T
10. Conclusion

**Require:**

1. Investment in Floods Protection Infrastructures;
2. People’s Awareness of Disaster Mitigation;
3. Installation of Appropriate Technology for Early Warning System;
4. Cooperation Among Countries for Experience Sharing;
5. Technical Assistance on Infrastructure Planning with regards to Climate Change.
Terimakasih!

Thank You